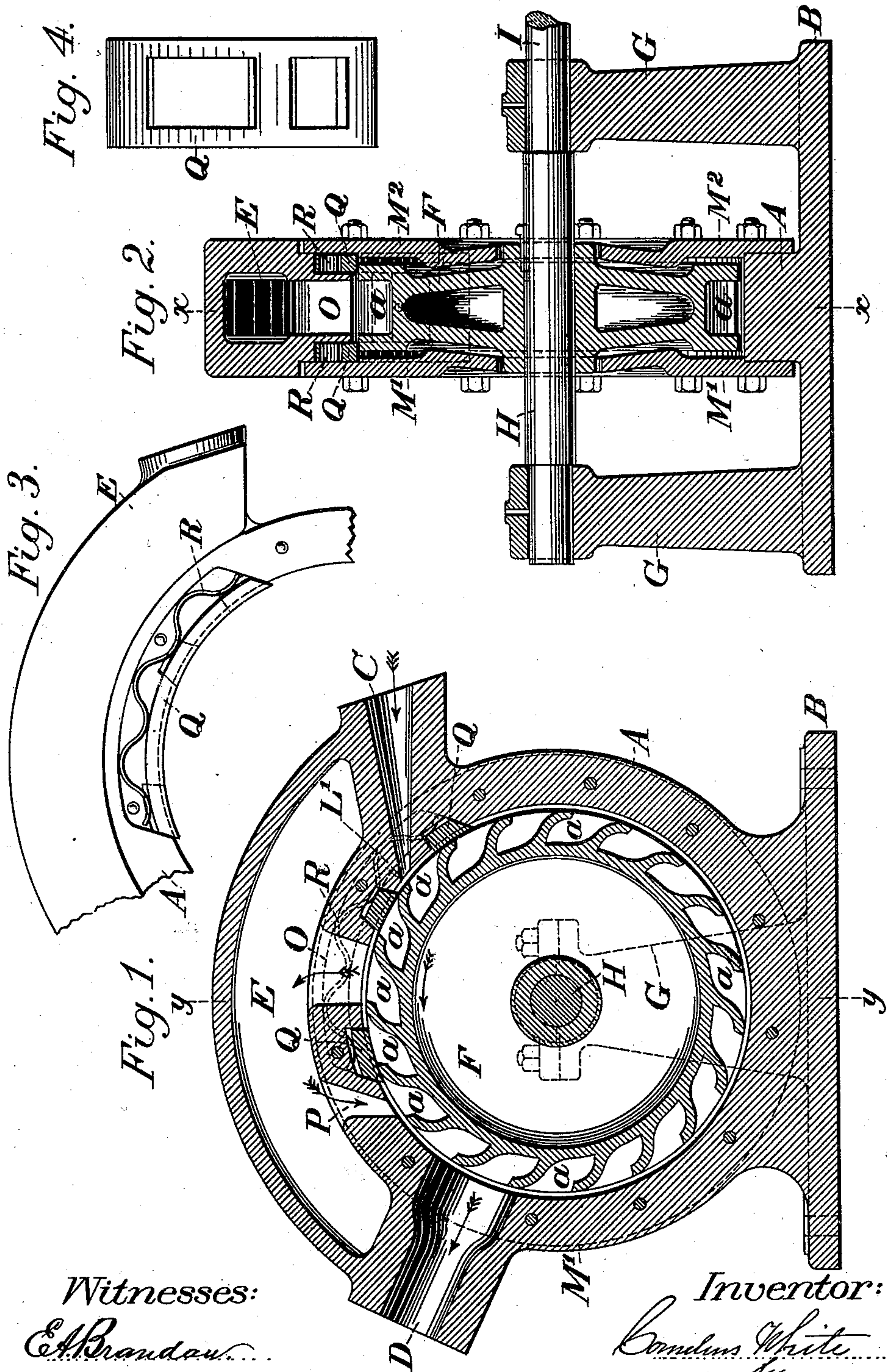


(No Model.)

C. WHITE.  
STEAM ENGINE.

No. 507,468.

Patented Oct. 24, 1893.



Witnesses:  
E. Brandon...  
Wilson D. Bent, Jr.

Inventor:  
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Att'y



# UNITED STATES PATENT OFFICE.

CORNELIUS WHITE, OF OAKLAND, CALIFORNIA.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 507,468, dated October 24, 1893.

Application filed March 9, 1893. Serial No. 465,343. (No model.)

*To all whom it may concern:*

Be it known that I, CORNELIUS WHITE, a citizen of the United States, residing in Oakland, county of Alameda, and State of California, have invented certain new and useful Improvements in Steam-Engines, as set forth in the following specification and drawings therewith, which I hereby declare to be a full, clear, and exact description of my invention.

My improvements relate to steam engines impelled by the impulse of a jet or jets of steam that impinge upon floats or vanes, and to improved methods of constructing the same.

My invention consists in the application of elastic or yielding surfaces to seal the joints against the escape of steam while acting on the engine and the inlets thereto, so as to avoid the employment of close-running, rigid joints, and the consequent care and expense of great accuracy in construction that has hitherto been required in this class of engines; also in rendering the action of the steam compound, by means of a receiver chamber and a second inlet nozzle or nozzles, the escape of steam in both cases being prevented by the elastic joint before named.

Referring to the drawings herewith—Figure 1 is a section on the line  $x x$  of Fig. 2, and transverse to the axis of rotation, showing an engine made according to my improvements. Fig. 2 is a section on the line  $y y$  of Fig. 1, parallel to the axis of rotation. Fig. 3 is a detail of Fig. 1 showing a part of the side of the engine with the covering plate removed. Fig. 4 is another detail showing the back of the elastic packing plate that rests on the periphery of the revolving wheel.

Similar letters of reference on the different figures indicate corresponding parts thereof.

Referring to Fig. 1, A is the main member and frame of the engine, formed integrally with the base B, inlet nozzle C, discharge nozzle D, and receiver or expansion chamber E. This main member A, has a central bore to receive the piston wheel F, and at its sides is provided with pedestals G, for supporting the shaft H, on which the piston wheel F is mounted. This shaft H is extended at I to receive a pulley or other gearing for transmitting the power of the engine. On the periphery of the piston wheel F, are formed

vanes or cup-like buckets  $a$ , into which the steam, entering at C, is discharged by the nozzle L'. 55

The sides of the engine are inclosed by the two circular plates  $M' M^2$ , held by bolts or screws in the usual manner. Steam enters at C and is discharged by the nozzle L' into the buckets  $a$ , and after being carried a short distance, is discharged through the port O into the chamber E, from which it is discharged upon the wheel a second time at a lower pressure, through the other nozzle P, into the buckets  $a$ , and finally escapes to the atmosphere through the exhaust way D. 65

To maintain a steam-tight joint, and prevent the escape of vapor over that portion of the piston wheel F, acted on by the steam jets, I employ a covering plate Q, shown most clearly in Figs. 3 and 4. The inner face of this plate Q, fits closely on the periphery of the piston wheel F, and is held in contact therewith, by means of the springs R. This plate is perforated, as shown in Fig. 4, so as to fit over inward projecting ledges around the nozzle L', and the first exhaust port O, also abuts at its ends, so that no movement can take place in the direction of the piston wheel's rotation. Some free space is left at the back of this plate Q, as shown in Fig. 1, so that it may have a limited movement outward from the center, and thus secure a free fit on its inner or running surface in contact with the piston wheel F. Thus it will be seen that this plate Q forms a complete packing around the inlet nozzle L' and exhaust nozzle O, and retains any pressure in the chamber or receiver E, and prevents leaks around the inlet nozzle L', so that no escape of steam under pressure can take place without its impingement on the wheel F, and giving out the power due to its impulsive effect. It will also be seen that by this method and the employment of the adjustable plate Q, held by elastic pressure, there is no requirement for other close running joints, and the usual accuracy and expense of construction is much reduced. The springs R, can be of any suitable kind to press upon the plate Q, and if necessary can be made adjustable from the outside. The undulating form is preferable, because of their simplicity and bearing at a number of points. 100



While I have shown my improved engine with but two inlet nozzles for steam, and one expansion chamber, it is obvious that two or more nozzles can be applied for either the  
5 initial or expanded steam; also, that one or more expansion chambers E, can be provided, without departing from my invention.

Having thus explained the nature and objects of my invention, what I claim as new,  
10 and desire to secure by Letters Patent, is—

1. In an impulse engine, a main frame, a piston wheel therein having a series of buckets around its periphery, an initial steam inlet nozzle as herein described, a receiver or  
15 expansion chamber, a second or discharge nozzle leading therefrom so that steam will be applied twice at different pressures and an adjustable and elastically-supported packing or covering plate fitting on the periphery of  
20 the wheel and covering such portions thereof as may be subject to pressure.

2. In an impulse engine, a main inclosing frame and a piston wheel therein, the latter having a series of buckets around its periph-  
25 ery, an initial steam inlet nozzle as herein described, a receiver or expansion chamber and a second or discharge nozzle leading therefrom, so the steam will be twice applied

at different pressures, in the manner substantially, and for the purposes described. 30

3. In an impulse engine, the main member having a central bore, a piston wheel therein having a series of buckets around its periphery, a receiver or expansion chamber, an initial steam inlet nozzle and a yieldingly ar-  
35 ranged packing fitting on a part or parts of the periphery of the wheel, substantially as and for the purpose specified.

4. In an impulse engine as herein described, a piston wheel and an inlet nozzle for steam  
40 connecting from a steam boiler or source of supply, an exhaust passage to a receiver or expansion chamber, and a second nozzle or jet, connecting from this chamber to the wheel, a final exhaust port, and an elastic  
45 packing covering plate, surrounding and packing the first nozzle and first exhaust port, in the manner substantially, and for the purposes described.

In testimony whereof I have hereunto af-  
50 fixed my signature in the presence of two witnesses.

CORNELIUS WHITE.

Witnesses:

ALFRED A. ENQUIST,  
WILSON D. BENT, Jr.